

AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated in the listing of claims below. This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Currently amended): An auxiliary agitator for a flotation device of the type having a tank, a primary agitator including a primary rotor adapted to induce radial fluid flow, drive means, and a drive shaft disposed intermediate the drive means and the primary rotor, the auxiliary agitator including:

an auxiliary agitation blade disposed above the primary rotor and adapted, in use, to induce axial fluid flow in a downward direction so as to supplement a secondary flow induced in the tank by the primary rotor; and

connecting means for connecting the auxiliary agitation blade to the drive shaft for conjoined rotation with the primary rotor.

Claim 2 (Previously presented): The auxiliary agitator according to claim 1, wherein the auxiliary agitation blade defines an angle of incidence that is substantially constant along the length of the blade.

Claim 3 (Previously presented): The auxiliary agitator according to claim 2, wherein the angle of incidence is between 15 degrees and around 75 degrees with respect to the direction of travel of the blade.

Claim 4 (Previously presented): The auxiliary agitator according to claim 1, wherein the auxiliary agitation blade defines an angle of incidence that varies along the length of the auxiliary agitation blade.

Claim 5 (Previously presented): The auxiliary agitator according to claim 1, wherein the pitch of the blade is adjustable depending on specific system parameters within the tank.

Claim 6 (Previously presented): The auxiliary agitator according to claim 1, wherein the auxiliary agitation blade includes a substantially straight leading edge.

Claim 7 (Previously presented): The auxiliary agitator according to claim 1, wherein the leading edge of the auxiliary agitation blade is curved.

Claim 8 (Previously presented): The auxiliary agitator according to claim 1, wherein the auxiliary agitation blade is releasably connected to the drive shaft to allow its position relative to the primary rotor to be adjusted.

Claim 9 (Previously presented): The auxiliary agitator according to claim 1, wherein, in use, the auxiliary agitation blade is connected to the drive shaft at around a midheight of the tank.

Claim 10 (Previously presented): The auxiliary agitator according to claim 1, wherein the connecting means includes a clamp.

Claim 11 (Previously presented): The auxiliary agitator according to claim 10, wherein the clamp is formed of two inter-engageable clamping halves.

Claim 12 (Previously presented): The auxiliary agitator according to claim 11, wherein the two inter-engageable clamping halves are substantially identical.

Claim 13 (Previously presented): The auxiliary agitator according to claim 10, wherein inner walls of the clamp together define a generally cylindrical clamping surface.

Claim 14 (Previously presented): The auxiliary agitator according to claim 1, wherein the connecting means includes welds or bolts.

Claim 15 (Previously presented): The auxiliary agitator according to claim 1, including a resilient protective layer coating its exterior surfaces.

Claim 16 (Previously presented): The auxiliary agitator according to claim 15, wherein the resilient protective layer is greater than around 3 mm thick.

Claim 17 (Previously presented): The auxiliary agitator according to claim 15, wherein the resilient protective layer is between around 5 mm and around 7 mm thick.

Claim 18 (Previously presented): The auxiliary agitator according to claim 1, including a pair of the auxiliary agitation blades, in use extending radially outwardly from diametrically opposite sides of the shaft, each auxiliary agitation blade having associated connecting means.

Claim 19 (Previously presented): The auxiliary agitator according to claim 1, including at least three of the auxiliary agitation blades, in use equally spaced around the perimeter of the drive shaft, each auxiliary agitation blade having associated connecting means.

Claim 20 (Previously presented): The auxiliary agitator according to claim 18 or claim 19, wherein, in use, each auxiliary agitation blade intersects the shaft at an angle of incidence of around 45 degrees.

Claim 21 (Previously presented): Agitation means for a flotation device of the type having a tank, a primary agitator including a primary rotor, drive means, and a drive shaft disposed intermediate the drive means and the primary rotor, said agitation means including:

a drive shaft;

a primary rotor adapted to induce radial fluid flow and connected to one end of the drive shaft to form the primary agitator; and

an auxiliary agitator as defined in claim 1.

Claim 22 (Original): Agitation means according to claim 21, wherein the auxiliary agitation blade is releasably connected to the shaft to allow its position relative to the primary rotor to be adjusted.

Claim 23 (Previously presented): Agitation means according to claim 21, being adapted for use in a three phase environment.

Claim 24 (Previously presented): A flotation device including:

a tank for containing slurry incorporating minerals to be extracted;

a feed inlet for admission of slurry into the tank;

agitation means, as defined in claim 21, to agitate the slurry within the tank; and

aeration means to aerate the slurry whereby floatable minerals in suspension form a surface froth.

Claim 25 (Previously presented): The flotation device according to claim 24, including a stator surrounding the primary rotor.

Claim 26 (Previously presented): The flotation device according to claim 24, including a peripheral overflow launder extending around the inside top of the tank for recovering mineral enriched froth from the surface.

Claim 27 (Previously presented): The flotation device according to claim 24, wherein the aeration means includes an air blower and a fluid conduit for directing air from the blower into the primary rotor.

Claim 28 (Previously presented): The flotation device according to claim 27, wherein the fluid conduit includes an axial bore extending through the drive shaft.

Claim 29 (Previously presented): The flotation device according to claim 27, wherein the fluid conduit is disposed to direct air into the primary rotor from underneath.

Claim 30 (Previously presented): The flotation device according to claim 24, including a froth deflection cone extending around the drive shaft adjacent the top of the tank, the smallest diameter of the cone being at its lowermost end nearest the primary rotor.

Claim 31 (Previously presented): The flotation device according to claim 30, wherein the froth deflection cone is disposed to deflect froth outwardly toward an overflow launder as it migrates toward the surface of the tank.

Claim 32 (Previously presented): The flotation device according to claim 30, wherein the froth deflection cone is disposed to prevent vortexing at the tank surface.

Claim 33 (Cancelled)

Claim 34 (Previously presented): The flotation device according to claim 30, wherein the auxiliary agitator is located substantially midway between the top of the rotor and the bottom of the froth deflection cone.

Claim 35 (Previously presented): The flotation device according to claim 30, including a reagent addition tube extending downwardly into the tank through the froth deflection cone.

Claim 36 (Previously presented): The auxiliary agitator as defined in claim 1, adapted for agitating a slurry containing up to around 55% solids.

Claim 37 (Previously presented): The auxiliary agitator as defined in claim 1, adapted for use in the flotation device having a tank with a capacity of at least 50m³.

Claim 38 (Previously presented): The auxiliary agitator as defined in claim 1, wherein the auxiliary agitation blade, in use, acts as an axial impeller to supplement an axial flow induced in the tank by the primary rotor.

Claim 39 (Previously presented): The auxiliary agitator as defined in claim 38, wherein said axial impeller has a diameter of around 15% to around 35% of the tank diameter.

Claim 40 (Previously presented): The auxiliary agitator according to claim 5, wherein the specific system parameters include slurry density, slurry viscosity or flow characteristics within the tank.

Claim 41 (Previously presented): Agitation means according to claim 23, wherein the three phase environment includes water, solids and air.

Claim 42 (New): The auxiliary agitator as defined in claim 1, wherein the auxiliary agitation blade is part of an axial impeller.